

3.7 Final Plans for Review Submission (Roadways and Structures)

3.7.1 General

The final plans are submitted for review when they are approximately 85% to 90% complete. Should the project involve both structure and highway design, then separate but coincident submissions should be prepared. The highway design submission shall be accompanied by the final design checklist. (See Appendix B.)

3.7.2 Resolution of Previous Drainage Comments

Comments made previously in the semifinal design phase should be incorporated or addressed accordingly. As discussed in the previous section, justification is required for all comments that have not been incorporated.

3.7.3 Drainage Report and Plans

A final drainage report and final plans should be submitted for review.

3.7.4 Permits

At this stage of design, the necessary permit applications should have been forwarded to ConnDEP through the Office of Environmental Planning for processing and approval.

3.7.5 Structures

The following final design submission requirements refer to structures over waterways. The final design submission includes the various water surface models discussed in Section 3.5. However rather than several alternates evaluated for the Preliminary Design phase, only the proposed structure chosen during the structure type selection process is reflected in the hydraulic, FEMA, and SCEL models. The designer should provide the following design reports for final submission:

- Final Hydraulic Design Report – reflecting the proposed structure chosen to be advanced to final design.
- Final Scour Report – if the proposed structure is a bridge. A scour report is not required for a culvert with a concrete bottom. Chapter 9 (Bridges) discusses the requirements for the Scour Report.
- Final Floodway Analysis Report – if there is an established floodway
- Final SCEL Report – if there is involvement within Stream Channel Encroachment Lines. These water surface models are similar to those submitted during the Structure Type Study phase however, only the proposed structure model is compared with the existing condition model rather than all the feasible alternates.

3.7.6 Final Structure Plans

The following data for riverine (inland) structures, as shown in Table 3-1, shall be included in tabular form on the general plan sheet:

Table 3-1

Drainage Area	sq. km (sq. mile)
Design Frequency	year
Design Discharge	cms (cfs)
Average Daily Flow Elevation	m (ft) - <i>indicate</i> Estimated or Observed. <i>For observed, show date.</i>
Upstream Design Water Surface Elevation	m (ft)
Downstream Design Water Surface Elevation	m (ft)
Maximum Scour Elevation	m (ft)
Frequency	year
Discharge	cms (cfs)
Worst case scour sub-structure unit	<i>indicate</i> Abutment # or Pier #

- The design water surface and average daily flow elevations, from Table 3-1, shall be shown graphically on the cross section of elevation view. The upstream water surface elevation is typically taken at the approach cross section.
- Scour information not applicable for culverts (enclosed conduits).

The following data for tidal structures, as shown in Table 3-2, shall be included in tabular form on the general plan sheet in lieu of Table 3-1 above:

Table 3-2

Mean Low Water	m (ft)	
Mean High Water	m (ft)	
High Tide Line (1-Year Tide)	m (ft)	
10- Year Tide	m (ft)	
100- Year Tide	m (ft)	
Design Frequency/Event*	Tidal: year/event	Riverine: year/event
Design Discharge	cms (cfs)	
Design Water Surface Elevation – Ebb Direction	m (ft)	
Design Water Surface Elevation – Flood Direction	m (ft)	
Maximum Scour Elevation	m (ft)	
Frequency/Event*	Tidal: year/event	Riverine: year/event
Discharge	cms (cfs)	
Worst case scour sub-structure unit	<i>indicate</i> Abutment # or Pier #	

* Event means other occurrence such as average daily flow, mean high water, mean low water, etc.

- Design frequency/event for tidal structures may be based on riverine floods, tidal storm surge or a combination of tidal storm surge and riverine flooding. See Sections 9.3.8 and 9.4.5 for further discussion.

Examples:

- (1) The **Design Discharge Elevation** at a structure was determined based on a 100-year riverine flood in combination with a 10-year tide. The Design Frequency/Event information in Table 3-2 would be completed as follows:

Design Frequency/Event	Tidal: 10-year	Riverine: 100-year
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- (2) The **Maximum Scour Elevation** is based on a 500-year tidal storm surge in combination with an average daily riverine flow. The Design Frequency/Event information in Table 3-2 would be completed as follows:

Frequency/Event	Tidal: 500-year	Riverine: Average Daily Flow
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- The design, mean high and mean low water elevations shall be shown on the cross section view.

For projects requiring the use of temporary hydraulic and/or water handling facilities, the tabulated stage/discharge data shown on Table 3-3 for riverine structures or Table 3-4 for tidal structures, shall be included, typically on the stage construction/water handling plans. The temporary design water surface elevations shall also be shown graphically on the cross section or elevation view. The minimum top elevation of cofferdams being utilized to isolate or divert the stream flow away from the work area shall be indicated on the plan. This information is provided to assist the contractor during construction. Section 9.6.12 of Chapter 9, Bridges, discusses the hydraulic design of temporary hydraulic facilities.

Table 3-3

Average Daily Flow	m ³ /s (cfs)
Average Spring Flow	m ³ /s (cfs)
2-Year Frequency Discharge*	m ³ /s (cfs)
Temporary Design Discharge	m ³ /s (cfs)
Temporary Design Frequency	Year
Temporary Water Surface Elevation Upstream	m (ft)
Temporary Water Surface Elevation Downstream	m (ft)

* not included if same as temporary design discharge

- The average daily and spring flows are determined by the method described in Chapter 6, Hydrology, Section 6.16. The temporary design discharge is determined by the procedure described in Section 6.F.1.

Table 3-4

Mean Low Water	m (ft)	
Mean High Water	m (ft)	
High Tide Line (1-Year Tide)	m (ft)	
Temporary Design Frequency	Tidal: year	Riverine: year
Temporary Design Discharge	cms (cfs)	
Temporary Design Elevation	m (ft)	

3.7.7 Environmental Permit Aspects

The Hydraulics and Drainage Section offers technical assistance in reviewing the various water surface profile models associated with structures.

Upon concurrence by the Hydraulics and Drainage Section, the FPM and/or SCEL applications should be forwarded to the Office of Environmental Planning. The application is then submitted to ConnDEP for certification. Permit requirements for a structure are discussed in Section 3.11 of this chapter.

The following standard conditions for approval of stormwater management standards taken from Section 25-68h-3(f) of the Flood Management Statutes and Administrative Regulations shall be incorporated into all ConnDOT projects:

- (1) All construction work shall incorporate best management practices to minimize soil erosion and sedimentation and conform with the "Connecticut Guidelines for Soil Erosion and Sediment Control."
- (2) All fill shall be clean, material free of stumps, rubbish, hazardous, and toxic material.
- (3) Contractor shall remove equipment and materials from the floodplain during periods when flood warnings have been issued or are anticipated by a responsible federal, state or local agency. It shall be the contractors responsibility to obtain such warnings when flooding is anticipated.
- (4) Contractor shall notify the Commissioner seven days prior to starting work on-site.
- (5) Once work is initiated, it shall proceed rapidly and steadily until completed and stabilized in order to minimize use of temporary structures and to minimize soil erosion.
- (6) Work shall not be conducted in or adjacent to watercourses and reservoirs used as public drinking water supply sources without further coordination with the water supply utility and Department of Health Services.
- (7) All temporary structures, cofferdams, and fill shall not impede the movement of flood flows and shall be removed at the completion of their use. The design of such temporary structure, cofferdams and fill shall be based on this manual, where applicable.
- (8) The applicant or his agent shall permanently maintain the proposed facility.